D3743: Tree-crop agroforestry systems promote natural control of the millet head miner, *Heliocheilus albipunctella*

Friday, September 30, 2016
09:00 AM - 02:00 PM
Convention Center - West Hall C

The millet head miner, *Heliocheilus albipunctella* (Lepidoptera, Noctuidae), is a major constraint to increasing crop productivity in sub-Saharan Africa. In the absence of any insecticide application by farmers, millet production relies on natural pest control by predators and parasitoids. However, the continued delivery of such ecosystem service is threatened by biodiversity loss due to simplification of land uses and deforestation. A better understanding of factors driving natural pest control is a major challenge for reducing yield losses due to insect pests. A set of 90 millet fields were selected in a 20*20 km area in Senegal, according to proportion of semi-natural habitats (mainly trees in traditional parkland agroforestry) and millet in the agricultural landscape. Surveys of pest incidence, natural pest control (natural enemy exclusion on sentinel plants, parasitism rates), and crop damage were carried out over two cropping seasons. High incidence of the millet head miner (75% infested heads) and variability among fields (34-94%) were observed. Grain losses ranged from 2-20%, but experimental evidence showed that they would have exceeded 90% in a quarter of fields in the absence of natural control. Density of trees in the agricultural landscape significantly enhanced natural pest control. Incidence of the millet head miner was negatively related to earliness of crop emergence and proportion of millet in the landscape. Further research is needed to better understand relationships between agroforestry systems, food web structure and biological control at a landscape scale. Next steps include farmer-participatory approaches to design farm- or land-scapes fostering natural pest regulation.

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